

TRANSLATION

PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference P803948/WO/1	FOR FURTHER ACTION		See Form PCT/IPEA/416
International application No. PCT/EP2004/009387	International filing date (<i>day/month/year</i>) 23.08.2004	Priority date (<i>day/month/year</i>) 23.09.2003	
International Patent Classification (IPC) or national classification and IPC C21D9/30, F16C3/08			
Applicant DAIMLERCHRYSLER AG			
<p>1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.</p> <p>2. This REPORT consists of a total of 5 sheets, including this cover sheet.</p> <p>3. This report is also accompanied by ANNEXES, comprising:</p> <p>a. <input checked="" type="checkbox"/> (<i>sent to the applicant and to the International Bureau</i>) a total of 2 sheets, as follows:</p> <p><input type="checkbox"/> sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).</p> <p><input type="checkbox"/> sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.</p> <p>b. <input type="checkbox"/> (<i>sent to the International Bureau only</i>) a total of (indicate type and number of electronic carrier(s)) _____, containing a sequence listing and/or tables related thereto, in computer readable form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).</p> <p>4. This report contains indications relating to the following items:</p> <p><input checked="" type="checkbox"/> Box No. I Basis of the report</p> <p><input type="checkbox"/> Box No. II Priority</p> <p><input type="checkbox"/> Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability</p> <p><input type="checkbox"/> Box No. IV Lack of unity of invention</p> <p><input checked="" type="checkbox"/> Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement</p> <p><input type="checkbox"/> Box No. VI Certain documents cited</p> <p><input type="checkbox"/> Box No. VII Certain defects in the international application</p> <p><input type="checkbox"/> Box No. VIII Certain observations on the international application</p>			

Date of submission of the demand	Date of completion of this report
Name and mailing address of the IPEA/EP	Authorized officer
Facsimile No.	Telephone No.

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.
PCT/EP2004/009387

Box No. I Basis of the report

1. With regard to the language, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.

This report is based on translations from the original language into the following language _____, which is the language of a translation furnished for the purposes of:

 - international search (Rule 12.3 and 23.1(b))
 - publication of the international application (Rule 12.4)
 - international preliminary examination (Rule 55.2 and/or 55.3)
2. With regard to the elements of the international application, this report is based on (*replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report*):

the international application as originally filed/furnished
 the description:
 pages 1–4 _____ as originally filed/furnished
 pages* _____ received by this Authority on _____
 pages* _____ received by this Authority on _____
 the claims:
 nos. 3, 4 _____ as originally filed/furnished
 nos.* _____ as amended (together with any statement) under Article 19
23.06.2005 with letter
 nos.* 1, 2 _____ received by this Authority on of 22.06.2005
 nos.* _____ received by this Authority on _____
 the drawings:
 sheets _____ as originally filed/furnished
 sheets* _____ received by this Authority on _____
 sheets* _____ received by this Authority on _____
 a sequence listing and/or any related table(s) – see Supplemental Box Relating to Sequence Listing.
3. The amendments have resulted in the cancellation of:

the description, pages _____
 the claims, nos. _____
 the drawings, sheets/figs _____
 the sequence listing (*specify*): _____
 any table(s) related to sequence listing (*specify*): _____
4. This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).

the description, pages _____
 the claims, nos. _____
 the drawings, sheets/figs _____
 the sequence listing (*specify*): _____
 any table(s) related to sequence listing (*specify*): _____

* If item 4 applies, some or all of those sheets may be marked "superseded."

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.	PCT/EP2004/009387
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Box No. V	Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
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1. Statement

Novelty (N)	Claims	1–2	YES
	Claims	_____	NO
Inventive step (IS)	Claims	1–2	YES
	Claims	_____	NO
Industrial applicability (IA)	Claims	1–2	YES
	Claims	_____	NO

2. Citations and explanations (Rule 70.7)

1. Reference is made to the following document:

D1: WO 00/47362 A (UNITED ENG FORGINGS LTD; HOYES MICHAEL EDWARD (GB)) 17 August 2000
 (2000-08-17)

2. Document D1 is considered the prior art closest to the subject matter of claim 1 and discloses (the references between parentheses refer to that document):

a forged steel crankshaft with a drive wheel made from machine steel for a diesel engine, the ring gear and the crankshaft forming a single unit [page 1, lines 16–22, figure 1]. The ring gear is subsequently hardened [page 1, lines 21–23].

2.1. The subject matter of claim 1 differs from that known from document D1 in that the crankshaft consists of austempered ductile cast iron (ADI) and in that the teeth of the gear wheel are made even harder by the application of carbide-containing coatings (CADI).

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.
PCT/EP2004/009387Box No. V **Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

The subject matter of claim 1 is thus novel (PCT Article 33(2)).

- 2.2. The technical problem of interest is that of producing in the most efficient manner possible a crankshaft with integrated ring gear that is capable of bearing high loads.
- 2.3. The solution to this problem as proposed in claim 1 of the present application involves an inventive step (PCT Article 33(3)) for the following reasons:

Cast crankshafts made from ADI are known in the art. There is nothing, however, to suggest casting a crankshaft with integrated ring gear in a single unit from ADI and at the same time improving the resistance to wear of the gear wheel teeth by applying carbidic coatings.

3. Document D1 is considered the prior art closest to the subject matter of claim 2 and discloses:

a method for producing a crankshaft with combined gear wheel, in which the shaft and the gear wheel flange are first formed from a single piece of machine steel, the gear wheel teeth then being formed thereon by machining [page 3, lines 7-14].

The subject matter of claim 2 differs therefrom in that the crankshaft with gear wheel is integrally

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITYInternational application No.
PCT/EP2004/009387**Box No. V** **Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

cast and the hardness of the teeth is increased further by the application of carbide-containing coatings.

The technical problem of interest is therefore that of devising an efficient method for producing a high-strength integral crankshaft with gear wheel.

The solution proposed in claim 2 involves an inventive step, since the prior art does not suggest casting an integral crankshaft with ring gear from an ADI alloy and further increasing the resistance to wear by applying carbide-containing coatings to the teeth.